TRAVAUX DU MUSÉUM NATIONAL D'HISTOIRE NATURELLE «GRIGORE ANTIPA»

THE JOURNAL OF "GRIGORE ANTIPA" NATIONAL MUSEUM OF NATURAL HISTORY

Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 65 (1): 25–36 (2022)
doi: 10.3897/travaux.65.e82873

FAUNISTIC NOTE

# First records of the alien *Eucalyptus* psyllids *Blastopsylla occidentalis* (Hemiptera, Aphalaridae) from Cyprus and *Platyobria biemani* (Hemiptera, Aphalaridae) from Cyprus and continental Greece

Jakovos Demetriou[1, 2], Evangelos Koutsoukos[3, 4], Leonidas-Romanos Davranoglou[5], Helen E. Roy[6], Malkie Spodek[7], Angeliki F. Martinou[1, 2, 8]

1 *Joint Services Health Unit Cyprus, BFC RAF Akrotiri BFPO 57, Akrotiri, Cyprus*
2 *Enalia Physis Environmental Research Centre, Acropoleos 2, Aglantzia 2101, Nicosia, Cyprus*
3 *Department of Ecology and Systematics, Faculty of Biology, National and Kapodistrian University of Athens, 15784 Athens, Greece*
4 *Museum of Zoology, National and Kapodistrian University of Athens, 15784 Athens, Greece*
5 *Oxford University Museum of Natural History, University of Oxford, OX1 3SZ, UK*
6 *UK Centre for Ecology & Hydrology, Oxfordshire, United Kingdom*
7 *The Steinhardt Museum of Natural History, Tel Aviv University, Israel*
8 *Climate and Atmosphere Research Centre/ Care-C, The Cyprus Institute, Athalassa Campus, 20 Konstantinou Kavafi Street, 2121 Aglantzia, Nicosia, Cyprus*

Corresponding author: *Jakovos Demetriou* (jakovosdemetriou@gmail.com)

Received 3 March 2022 | Accepted 29 April 2022 | Published 30 June 2022

**Citation:** Demetriou J, Koutsoukos E, Davranoglou L-R, Roy HE, Spodek M, Martinou AF (2022) First records of the alien *Eucalyptus* psyllids *Blastopsylla occidentalis* (Hemiptera, Aphalaridae) from Cyprus and *Platyobria biemani* (Hemiptera, Aphalaridae) from Cyprus and continental Greece. Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa" 65(1): 25–36. https://doi.org/10.3897/travaux.64.e82873

## Abstract

The psyllids *Platyobria biemani* Burckhardt, Queiroz & Malenovský, 2014 and *Blastopsylla occidentalis* Taylor, 1985 (Hemiptera: Psylloidea: Aphalaridae) originally native to Australia, have now spread to the Eastern Mediterranean as pests of *Eucalyptus* spp. In the present study, we provide the first records of these species from Cyprus and we expand the range of *P. biemani* within continental Greece. The specimens were collected from ornamental *Eucalyptus* trees in Paphos and Limassol districts. In addition, material surveys in Greece revealed the presence of *P. biemani* in Attica (Salamis Island and Nea Peramos). Given the number of sampled sites, both species should be classified as established pests responsible for small-scale, local infestations of *Eucalyptus* spp. The Australian *Glycaspis brimblecombei*

Moore, 1964, already known from Cyprus, is widespread on the island and its effects undermine the aesthetics of natural and urban landscapes. The socioeconomic impacts of alien *Eucalyptus* psyllids in Cyprus are discussed.

**Keywords**
alien insects, biological invasions, *Eucalyptus*, Mediterranean, non-native species, Sternorrhyncha, Psylloidea.

## Introduction

Representatives of the genus *Eucalyptus* L'Hér. have been introduced across the globe outside their native range for the production of pulp and timber, as well as for the drying of marshes during anti-malarial campaigns (Cocquempot and Lindelöw 2010; Mifsud et al. 2010; Bayle 2019). While generally considered as ecological "deserts" (Brockerhoff et al. 2001), *Eucalyptus* spp. have been occasionally reported as beneficial to native biodiversity, especially in arid habitats (Herrmann et al. 2015). Nevertheless, even in such cases *Eucalyptus* plantations cannot substitute for natural habitats (Herrmann et al. 2015). Their extensive planting as ornamental and cultivars in urban, rural and natural habitats in the Mediterranean, has facilitated subsequent biological invasions of insects associated with *Eucalyptus*, such as the longhorn beetles *Phoracantha recurva* Newman, 1840 and *Phoracantha semipunctata* (Fabricius, 1775) (Cocquempot and Lindelöw 2010), alien hymenopteran leaf-gallers such as *Leptocybe invasa* Fisher & La Salle, 2004 and *Ophelimus maskelli* (Ashmead, 1900) (Dittrich-Schröder et al. 2020) as well as six alien Australian psyllids (Spodek et al. 2015). In particular, *Blastopsylla occidentalis* Taylor, 1985, *Ctenarytaina eucalypti* (Maskell, 1890), *Ctenarytaina peregrina* Hodkinson, 2007, *Ctenarytaina spatulata* Taylor, 1997, *Glycaspis brimblecombei* Moore, 1964 and *Platyobria biemani* Burckhardt, Queiroz & Malenovský, 2014.

*Eucalyptus* trees were first introduced to the island of Cyprus during the 1880s and were planted for afforestation of vast areas (Ciesla 2004; Harris 2007). Although some concerns about their suitability were voiced (Harris 2007), the general enthusiasm for them and continuous tree planting resulted in the establishment of numerous *Eucalyptus* species on the island (Harris 2007; Pescott et al. 2018). To this day, *Eucalyptus* spp. are extensively planted as ornamentals in a diverse range of urban, semi-urban, rural, agricultural and natural habitats, including protected areas. Following their hosts, numerous wood-feeding, gall-inducing, sap-sucking, predacious and parasitic species have been introduced and detected in Cyprus (Demetriou 2021; Demetriou et al. 2021; Demetriou et al. 2022). To date, the only *Eucalyptus* psyllid, detected in Cyprus is *G. brimblecombei* (Karaca et al. 2017; Demetriou 2021). *Glycaspis brimblecombei* is a rapid colonizer, negatively affecting the fitness of *Eucalyptus* trees and the aesthetics of the urban landscape (Bella and Rapisarda 2013; Demetriou 2021).

*Blastopsylla occidentalis* is a species of psyllid widespread in the Mediterranean, reported from Italy (EPPO 2006), Turkey (Aytar 2007), Spain (Pérez-Otero et al. 2011), Portugal (Pérez-Otero et al. 2011), Israel (Spodek et al. 2015), and Malta (Mifsud 2020). On the contrary, records of *P. biemani* seem to be restricted to the Eastern Mediterranean. In particular, *P. biemani* was first described outside its native range by Burckhardt et al. (2014) from Lesvos Island (Greece), later it was detected in Israel (Burckhardt and Spodek 2015) and more recently in Turkey (Çıkarana and Avcı 2019) although it has yet to be found in its native range. Due to the serious impacts of other alien *Eucalyptus* psyllids such as *C. eucalypti*, further investigation on the distribution, biology and management of *P. biemani* was advised (Burckhardt et al. 2014; Burckhardt and Spodek 2015), in order to prevent further spread and development "into a serious new eucalypt pest".

## Materials and Methods

### *Study area, specimen collection and identification*

Weekly structured surveys using a beating sheet were undertaken at two sites in Limassol and four sites at the Akrotiri UK Sovereign Base Area from February to June 2021 (JD). These surveys were supplemented by occasional field surveys in Nicosia and Paphos districts during December 2020 to June 2021 as well as throughout collection of infested *Eucalyptus* leaves in sealed polyethylene bags from the 26th March to 4th April 2022 in Limassol city (Table 1). In Greece, *Eucalyptus* spp. trees were sampled weekly by hand from March to April and November 2021 in the Attica administrative region (EK) (Table 1). Specimens were examined under a stereomicroscope and identified as *B. occidentalis*, *G. brimblecombei* and *P. biemani* using the identification key of Spodek et al. (2015) (Table 1). Specimens are deposited in the Museum of Zoology (National and Kapodistrian University of Athens, Greece) (ZMUA), the Life Collections of the Oxford University Museum of Natural History (OUMNH), the Department of Ecology and Systematics, National and Kapodistrian University of Athens (NKUA) and the entomological collection of Joint Services Health Unit, Akrotiri, Cyprus (JSHU).

### *Maps*

The distribution map was created using QGIS free and open source Geographic Information System (https://qgis.org/en/site/).

**Table 1.** Metadata of surveyed localities.

| Country | Site | Latitude (decimal) | Longitude (decimal) | Habitat | Alt. (m) | Date | Coll. | Collected specimens |
|---|---|---|---|---|---|---|---|---|
| Cyprus | Nicosia, Aglantzia, Athalassa National Forest Park | 35,1250 | 33,3829 | Urban area – park | 150 | 23-Dec-2020 | J. Demetriou and E. Koliarou | No psyllids found |
| Cyprus | Limassol, Marina (Molos) | 34,6750 | 33,0475 | Urban park | 0 | Feb to Jun 2021 | J. Demetriou | *Blastopsylla occidentalis*; *Glycaspis brimblecombei* |
| Cyprus | Limassol, Port Area | 34,6453 | 33,0008 | *Eucalyptus* spp. windbreaker near crop | 0 | Feb to Jun 2021 | J. Demetriou | *Glycaspis brimblecombei* |
| Cyprus | Akrotiri UK Sovereign Base Area, salt lake | 34,6005 | 32,9730 | Cultivated land by the salt-lake | 5 | Feb to Jun 2021 | J. Demetriou | *Glycaspis brimblecombei*; *Platyobria biemani* |
| Cyprus | Akrotiri UK Sovereign Base Area, near forest nursery | 34,6268 | 32,9515 | *Acacia saligna* and *Eucalyptus* spp. forest | 10 | Feb to Jun 2021 | J. Demetriou | No psyllids found |
| Cyprus | Akrotiri village, Timios Stavros Church | 34,6024 | 32,9545 | Urban area – park | 10 | Feb to Jun 2021 | J. Demetriou | No psyllids found |
| Cyprus | Akrotiri marsh | 34,6300 | 32,9300 | Marshland bordered by cultivated land; *Eucalyptus* spp. | 5 | Feb to Jun 2021 | J. Demetriou | *Glycaspis brimblecombei* |
| Cyprus | Paphos, Kouklia, Aphrodite's Rock | 34,6669 | 32,6232 | Coastal area | 30 | 24-Jan-2021 | J. Demetriou and E. Koliarou | No psyllids found |
| Cyprus | Paphos, Choletria | 34,7651 | 32,6010 | Park with *Eucalyptus* spp. | 300 | 6-Feb-21 | J. Demetriou and E. Koliarou | No psyllids found |
| Cyprus | Paphos, Nata | 34,7756 | 32,5706 | Near cultivated rural area by the side of the road | 160 | 06-Feb-2021 + 11-Mar-2021 | J. Demetriou and E. Koliarou | *Platyobria biemani*; *Glycaspis brimblecombei* |
| Cyprus | Paphos, International Airport Area | 34,7270 | 32,4530 | Coastal area | 0 | 5-Jan-21 | J. Demetriou | No psyllids found |
| Cyprus | Paphos, Geroskipou | 34,7382 | 32,4366 | Urban coastal area | 0 | 18-Jan-21 | J. Demetriou and E. Koliarou | No psyllids found |
| Cyprus | Paphos, Drouseia | 34,9623 | 32,4090 | Rural area | 580 | 03-Jan-2021 | J. Demetriou and E. Koliarou | No psyllids found |
| Cyprus | Paphos, Polis Chrysochous camping site | 35,0400 | 32,4200 | *Eucalyptus* spp. Forest | 10 | 27-Mar-21 | J. Demetriou and E. Koliarou | No psyllids found |
| Greece | Attica, Salamis, Ambelakia | 37,9543 | 23,5314 | *Eucalyptus* spp. Across the road | 5 | 5-Mar-21 | E. Koutsoukos | No psyllids found |
| Greece | Attica, Salamis, Agia Maura | 37,9624 | 23,5030 | *Eucalyptus* spp. Across the road | 22 | 13-Mar-2021 | E. Koutsoukos | No psyllids found |
| Greece | Attica, Salamis, Steno Faneromenis | 37,9740 | 23,4370 | *Eucalyptus* spp. Next to the sea, in semi urban area | 2 | 15-Mar-2021 | E. Koutsoukos | *Platyobria biemani* |
| Greece | Attica, Salamis, Selinia | 37,9350 | 23,5330 | Semi urban area | 51 | 31-Mar-2021 | E. Koutsoukos | No psyllids found |
| Greece | Attica, Salamis, Kaki Vigla | 37,9116 | 23,4972 | Rural area | 45 | 27-Mar-2021 | E. Koutsoukos | No psyllids found |
| Greece | Attica, Salamis, Ergatikes katoikies | 37,9568 | 23,4672 | Semi urban area | 35 | 21-Apr-2021 | E. Koutsoukos | No psyllids found |
| Greece | Attica, Nea Peramos | 37,9996 | 23,4174 | Urban park with *Eucalyptus* spp., *Casuarina* sp. and *Pinus* sp. | 2 | 20-Nov-2021 | E. Koutsoukos | *Platyobria biemani* |

## Results

### *Material examined*

***Blastopsylla occidentalis* Taylor, 1985**

**CYPRUS**: Limassol, Marina (Molos) (34.6750°N, 33.0475°E), alt. 0 m, 1♀, 20.V.2021, collected from *Eucalyptus* sp. trees in urban park by using a beating sheet, coll. J. Demetriou (Fig. 1A) (JSHU); Limassol, Agia Zoni (34.6877°N, 33.0429°E), alt. 30 m, 15♀17♂, 02.IV.2022, reared from *Eucalyptus* sp. leaves collected in urban roadside, coll. E. Koutsoukos (ZMUA).

***Platyobria biemani* Burckhardt, Queiroz & Malenovský, 2014**

**CYPRUS**: Paphos, Nata (34.7756°N, 32.5706°E), alt. 160 m, 2♂, 06.ii.2021 and 11.iii.2021, collected from *Eucalyptus* near a cultivated rural area by the side of the road by using a beating sheet. The *Eucalyptus* spp. trees were observed bearing lerps resembling those of *G. brimblecombei* especially on young, reddish leaves, as well as galls of *L. invasa* (Demetriou et al. 2022), coll. J. Demetriou and E. Koliarou (OUMNH); Limassol, Agia Zoni (34.6877°N, 33.0429°E), alt. 30 m, 1♀, 02.IV.2022, reared from *Eucalyptus* sp. leaves collected in urban roadside, coll. E. Koutsoukos (ZMUA); **AKROTIRI UK SOVEREIGN BASE AREA:** Salt-lake (34.6005°N, 32.9730°E), alt. 5 m, 1♀, 12.VI.2021, collected from *Eucalyptus* spp. trees in windbreaker near crop by using a beating sheet, coll. J. Demetriou (Fig. 1B) (JSHU).

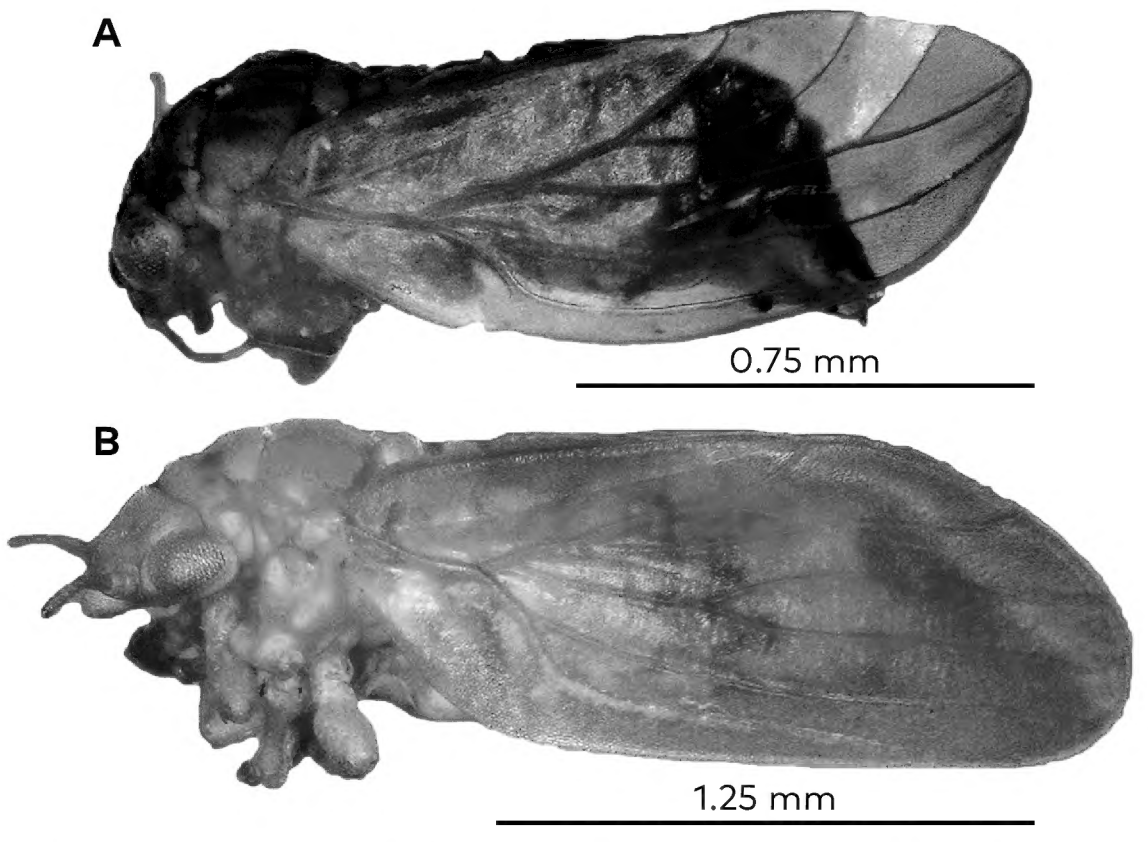


**Figure 1. A** ♀ *Blastopsylla occidentalis* Taylor, 1985 collected from Limassol, lateral view; **B** ♀ *Platyobria biemani* Burckhardt, Queiroz & Malenovský, 2014 collected from Akrotiri UK Sovereign Base Area, lateral view.

**GREECE:** Attica administrative region, Salamis Island, Steno Faneromenis (37.974°N, 23.437°E), alt. 2 m, 1♂, 15.iii.2021, collected by hand from an *Eucalyptus* sp. tree, coll. E. Koutsoukos (ZMUA); Attica administrative region, Nea Peramos (37.9996°N, 23.4174°E), alt. 2 m, 5♂2♀, 20.Xi.2021, collected from an *Eucalyptus* sp. tree by hand, coll. E. Koutsoukos (ZMUA).

***Glycaspis brimblecombei* Moore, 1964**

**CYPRUS**: Limassol, Marina (Molos) (34.6750°N, 33.0475°E), alt. 0 m, one individual, 31.III.2021, collected from *Eucalyptus* spp. trees in urban park by using a beat-sheet, coll. J. Demetriou.; one individual, 7.IV.2021; two individuals, 15.IV.2021; four individuals, 29.IV.2021; five individuals, 7.V.2021; six individuals, 20.V.2021; six individuals, 27.V.2021; 11 individuals, 3.VI.2021, five individuals, 12.VI.2021 (NKUA); Limassol, Port (34.6453°N, 33.0008°E), alt. 0 m, three individuals, 10.III.2021, collected from *Eucalyptus* spp. trees in windbreaker near crop by using a beat-sheet, coll. J. Demetriou; one individual, 24.III.2021, six individuals, 31.III.2021; one individual, 29.IV.2021; two individuals, 20.V.2021; one individual, 3.VI.2021; two individuals, 12.VI.2021 (NKUA); Paphos, Nata (34.7756°N, 32.5706°E), alt. 160 m, 06.ii.2021 and 11.iii.2021, observed on *Eucalyptus* near a cultivated rural area by the side of the road., obs. J. Demetriou and E. Koliarou; **AKROTIRI UK SOVEREIGN BASE AREA:** Akrotiri marsh (34.6300°N, 32.9300°E), alt. 5 m, III.2021, light infestation observed on *Eucalyptus* spp. bordering marshland, obs. J. Demetriou; Salt-lake (34.6005°N, 32.9730°E), alt. 5 m, II–VI.2021, large scale infestations observed on *Eucalyptus* spp. trees in windbreaker near crop, J. Demetriou (NKUA).

## Discussion

Specimens of *B. occidentalis* (Fig. 1A) and *P. biemani* (Fig. 1B) from Paphos and Limassol represent the first records of these alien species from Cyprus (Fig. 2). In addition, surveys in Attica (Greece) revealed the presence of *P. biemani* in the Saronic Gulf, representing an expansion of its previously known range in Greece (Burckhardt et al. 2014) (Fig. 3). *Glycaspis brimblecombei* was collected from five sites in Cyprus, including the Akrotiri marsh (RAMSAR wetland) and Akrotiri salt-lake protected areas (Fig. 2). These results contribute to our understanding of the distributional range of *P. biemani* in the Eastern Mediterranean (Fig. 3). Records from Israel (Burckhardt and Spodek 2015), Cyprus and Greece highlight the need for investigating the possible presence of *P. biemani* in neighbouring European (e.g. Albania, Bulgaria, and Italy), Asian (e.g. Lebanon and Syria) and North African countries (e.g. Egypt). The same applies to *B. occidentalis*, which has already spread across the Mediterranean but has yet to be found in the Balkans.

Regarding the impact of *B. occidentalis* and *P. biemani*, no negative effects on *Eucalyptus* spp. or socioeconomic parameters were observed. Infested trees were mostly affected by other alien *Eucalyptus* pests such as *G. brimblecombei*, *L. invasa*

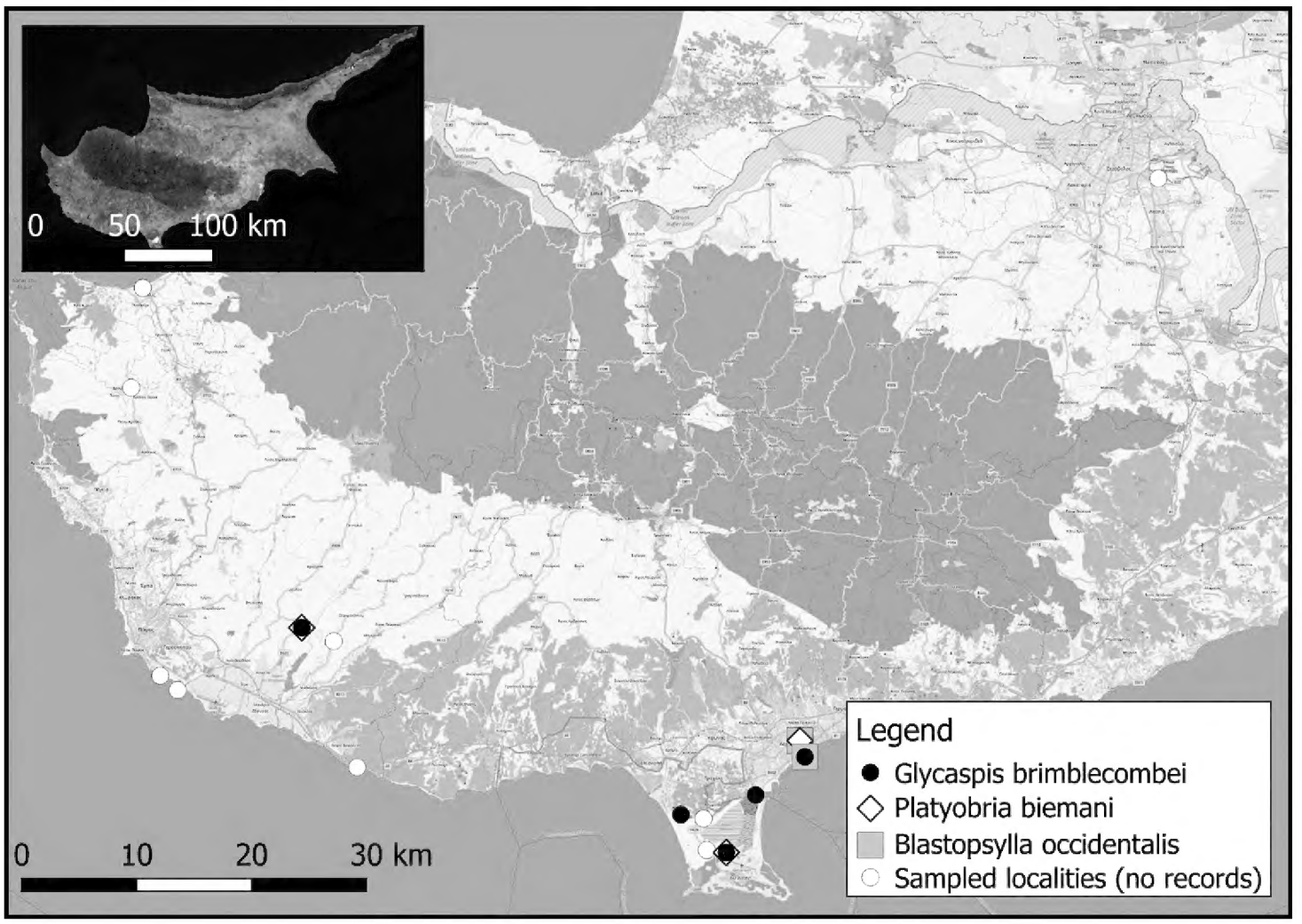


**Figure 2.** Sampling sites in Cyprus from December 2020 to June 2021 and 26th March to 4th April 2022. *Platyobria biemani* Burckhardt, Queiroz & Malenovský, 2014 (white diamonds) and *Blastopsylla occidentalis* Taylor, 1985 (grey rectangle) represent new records for the island.

and *O. maskelli* (Demetriou and Koutsoukos pers. observations). No records of species interactions, parasitoids or insects feeding out of honeydew were investigated in Greece and Cyprus although, natural enemies of *B. occidentalis* reported from Cameroon include ladybug predators and a parasitoid identified as *Psyllaephagus* sp. (Soufo and Tamesse 2015). Three of our sampling sites in Cyprus hosted *P. biemani* and just two *B. occidentalis* (Fig. 2). It is therefore likely that these species constitute minor pests of *Eucalyptus* spp. (Burckhardt et al. 2014; Burckhardt and Spodek 2015; Spodek et al. 2015), with infested trees being subjected to small-scale, local infestations. Nevertheless, further studies are needed in order to fully assess the impacts of these alien psyllids on *Eucalyptus* trees of Cyprus, as well as the presence of any native or accidentally introduced parasitoids and predators. In addition, the distribution, introduction pathways and spread of the species need to be closely monitored by implementing standardised collecting methods and molecular markers to better understand the invasion history of alien *Eucalyptus* psyllids (Burckhardt et al. 2014; Burckhardt and Spodek 2015; Spodek et al. 2015).

In contrast, *G. brimblecombei* has been found to cause negative socioeconomic impacts in Cyprus, mostly by undermining the aesthetics of nature and that of the urban landscape (Kueffer and Kull 2017; Demetriou 2021; Dept. of Forestry,

unpublished data). Since its initial detection on the island in 2015, the species has become widespread (Karaca et al. 2017; Demetriou 2021; Demetriou et al. 2022; Dept. of Forestry, unpublished data). On June 2019, the Department of Forestry issued an online statement informing the public about large-scale infestations caused by the psyllid throughout Cyprus (http://www.moa.gov.cy/moa/fd/fd.nsf/All/FE295879274AC330C2258435001B5E4E?OpenDocument). The Department also stated that specimens were mostly found on *Eucalyptus* trees in riverbeds, causing discolouration and shedding of their foliage. Due to the large amounts of honeydew excreted by the psyllid, the Department urged the public to avoid sitting under or near affected trees, while stating that the problem is expected to gradually begin to subside after August 2019. This notion already postulated back in 2015 was supported by the additional presence of the species' obligate parasitoid *Psyllaephagus bliteus* Riek, 1962 which was expected to gradually bring a "balance in the ecosystems where *Eucalyptus* trees grow", lowering populations of *G. brimblecombei* (http://www2.parliament.cy/parliamentgr/008_3g/23_06_010_05_024.htm). The Department's online statement was extensively covered by the media, spreading awareness about the species' presence and impacts. Despite reassurances, two years after the statement, follow-up material sampling in Limassol mentioned that *G. brimblecombei* was observed to negatively affect the

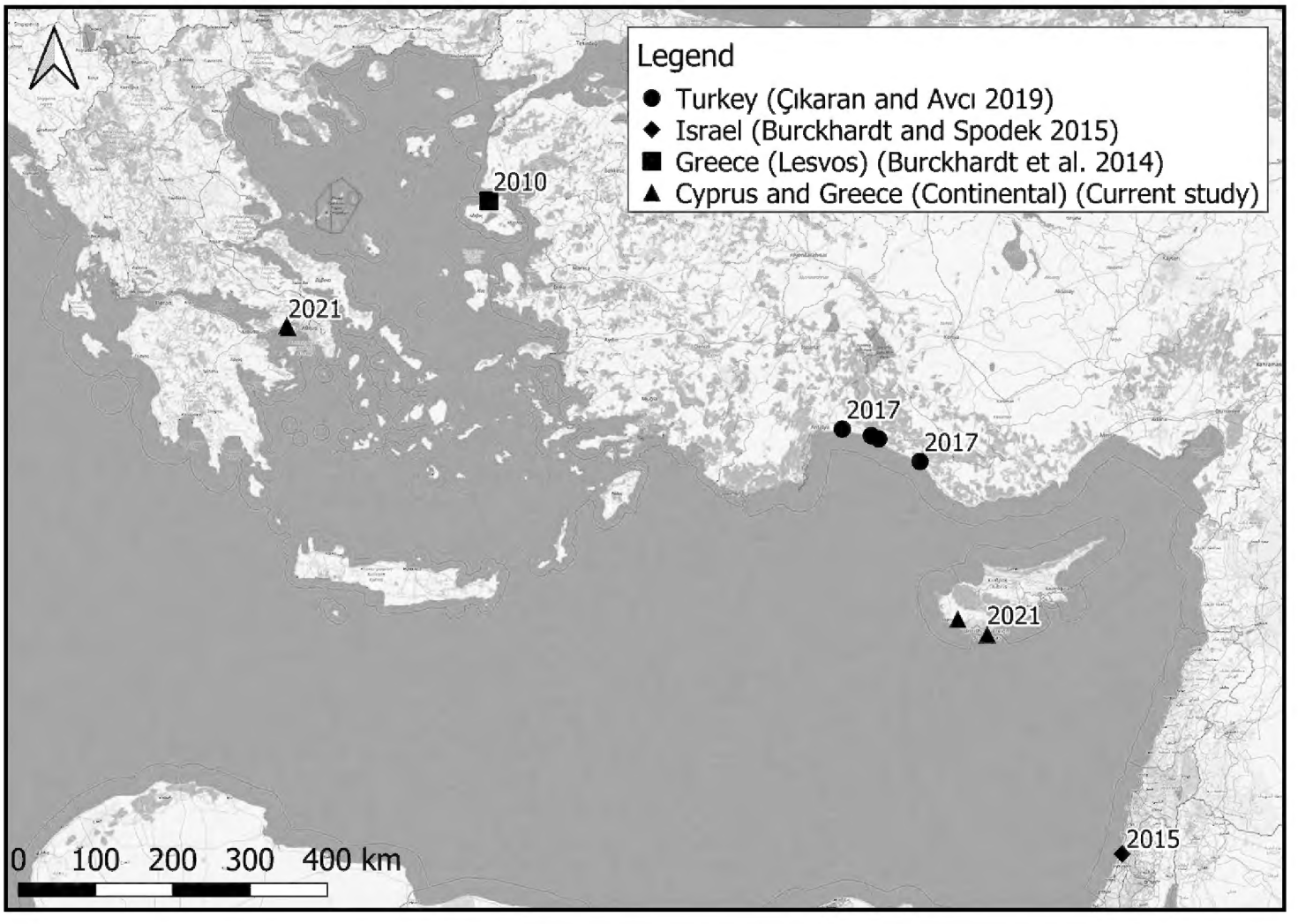


**Figure 3.** Known distribution of *Platyobria biemani* Burckhardt, Queiroz & Malenovský, 2014 in the Eastern Mediterranean. Sampling sites include Greece and Cyprus (current study) where the species was collected (black triangles). Year of first record (specimen collection year) displayed over points.

aesthetics of nature while its lerps filled low hanging branches surrounding public playgrounds and sidewalks (Demetriou 2021). Its sticky excretions regularly stained the author's equipment and clothing, especially during late spring and early summer months (Demetriou 2021). During surveys, infested leaves were collected in sealed polyethylene bags from which a few *P. bliteus* individuals emerged (Demetriou et al. 2022). Furthermore, during a visit to Athalassa National Forest Park in December 2021 the first author observed remnants of dried up, mouldy lerps presumably created by *G. brimblecombei*. Thus, the socioeconomic impacts of *G. brimblecombei* are seasonal and recurrent while *P. bliteus* seems unable to suppress the population explosions of its host (Demetriou et al. 2022), as already observed in other Mediterranean countries (Boavida et al. 2016).

Given the extensive distribution of *Eucalyptus* spp. in Cyprus, the large number of their associated alien insects should be closely monitored (Spodek et al. 2015; Mendel and Protasov 2019; Demetriou et al. 2022). Structured surveys could be supplemented by opportunistic citizen-science approaches i.e. throughout the provision of photographic material (Cianferoni et al. 2021), specimen collection, organizing BioBlitzes and interactive workshops for the early detection and monitoring of alien species (Groom et al. 2019; Meeus et al. 2021). In the case of *G. brimblecombei* which constructs conspicuous lerps, citizen scientists could also report observations of honeydew and their perceptions of it in order to gain a better understanding of the adverse socioeconomic impacts of the species as well as how these impacts change spatiotemporally. Citizen-science is subjected to multiple spatiotemporal biases, for example heavily influenced by infrastructure and population density (Isaac and Pocock 2015; Geldmann et al. 2016). Nevertheless, the majority of alien species inhabit man-made habitats (Lopez-Vaamonde et al. 2010). As such, public participation in scientific research can help in mapping the distribution and detecting new alien *Eucalyptus* associates, such as Australian psyllids of the genus *Ctenarytaina*, already reported in the Western Palearctic (Burckhardt 1998; Costanzi et al. 2003; Mansilla et al. 2004; Valente et al. 2004; Hodkinson 2007).

## Acknowledgments

We are grateful to Prof Margarita Arianoutsou and Dr Canella Radea (National and Kapodistrian Univeristy of Athens, Greece) for overseeing the MSc Thesis during which many of the first author's field surveys took place. We also kindly thank Ms Evi Koliarou for her valuable field assistance in spotting and collecting infested plant material. We are also thankful to Dr David Ouvrard for his valuable comments and corrections to the manuscript during the review process. Finally, we are thankful to the State Scholarship Foundation of Cyprus (IKYK) and the UK Government through Darwin Plus (DPLUS124), for funding this project and the postgraduate studies of Jakovos Demetriou. Prof Helen E Roy was supported by the Natural Environment Research Council award number NE/R016429/1 as part of the UK-SCAPE programme

Delivering National Capability. Dr Leonidas-Romanos Davranoglou acknowledges his Leverhulme Trust Early Career Fellowship grant (ECF-2021-199). Mr Evangelos Koutsoukos acknowledges COST Action CA17122 – Alien CSI, supported by COST (European Cooperation in Science and Technology), www.cost.eu.

## References

Aytar F (2007) Description, distribution and hosts of *Blastopsylla occidentalis* (Homoptera: Psyllidae), a new pest of *Eucalyptus* spp. in Turkey. Poster presented at the 2nd Plant Protection Congress of Turkey, Isparta, Turkey, 27–29 August 2007.

Bayle GK (2019) Ecological and social impacts of *Eucalyptus* tree plantation on the Environment. Journal of Biodiversity Conservation and Bioresource Management 5(1): 93–104. https://doi.org/10.3329/jbcbm.v5i1.42189

Bella S, Rapisarda C (2013) First record from Greece of the invasive red gum lerp psyllid *Glycaspsis brimblecombei* Moore (Hemiptera Psyllidae) and its associated parasitoid *Psyllaephagus bliteus* Riek (Hymenoptera Encyrtidae). Redia 96: 33–35.

Boavida C, Garcia A, Branco M (2016) How effective is *Psyllaephagus bliteus* (Hymenoptera: Encyrtidae) in controlling *Glycaspis brimblecombei* (Hemiptera: Psylloidea)? Biological Control 99: 1–7. https://doi.org/10.1016/j.biocontrol.2016.04.003

Brockerhoff EG, Ecroyd CE, Langer ER (2001) Biodiversity in New Zealand plantation forests: policy trends, incentives, and the state of our knowledge. New Zealand Journal of Forest Science 46: 31–37.

Burckhardt D (1998) *Ctenarytaina eucalypti* (Maskell) (Hemiptera, Psylloidea) new for central Europe and observations on the psyllid fauna of *Eucalyptus*. Mitteilungen der Entomologischen Gesellschaft Basel 48(2): 59–67. [in German]

Burckhardt D, Queiroz DL, Malenovský I (2014) First record of the Australian genus *Platyobria* Taylor, 1987 from Europe and *P. biemani* sp. nov. as a potential pest of *Eucalyptus* (Myrtaceae) (Hemiptera: Psylloidea). Entomologische Zeitschrift Schwanfeld 124(2): 109–112.

Burckhardt D, Spodek M (2015) *Platyobria biemani* (Hemiptera: Psylloidea: Aphalaridae), a new introduction into Israel and a potential pest of eucalypts. Israel Journal of Entomology 44–45: 99–100. https://doi.org/10.5281/zenodo.31644

Cianferoni F, Graziani F, Ceccolini F (2021) Review of the distribution of the alien species *Glycaspis brimblecombei* Moore, 1964 in Greece and first record for Albania. South Western Journal of Horticulture, Biology and Environment 12(1): 1–12.

Ciesla WM (2004) Forests and forest protection in Cyprus. The Forestry Chronicle 80(1): 107–113. https://doi.org/10.5558/tfc80107-1

Çıkarana G, Avcı M (2019) Leaf pest insects and natural enemies and some biological observations on eucalyptus trees in Antalya. Turkish Journal of Forestry 20(2): 80–92. https://doi.org/10.18182/tjf.521025 [in Turkish]

Cocquempot C, Lindelöw Å (2010) Longhorn beetles (Coleoptera, Cerambycidae). BioRisk 4(1): 193–218. https://doi.org/10.3897/biorisk.4.56

Costanzi M, Malausa JC, Cocquempot C (2003) A new psyllid on the eucalyptus of the Ligurian and French Riviera. First observations of *Ctenarytaina spatulata* on southern Europe. Phytoma – La Défense des Végétaux 566: 48–51. [in French]

Demetriou J (2021) Non-native insects in protected and urbanised areas in Cyprus. MSc Thesis, Department of Ecology and Systematics, Faculty of Biology, School of Science, National and Kapodistrian University of Athens, Greece.

Demetriou J, Koutsoukos E, Radea C, Roy HE, Arianoutsou M, Martinou AF (2022) Uninvited pests of an unwelcomed tree: a survey on alien chalcidoid wasps (Hymenoptera: Chalcidoidea) associated with *Eucalyptus* trees in Cyprus. BioInvasions Records 11(2): 390–400. http://dx.doi.org/10.3391/bir.2022.11.2.12

Demetriou J, Martinou AF, Radea C, Roy HE, Arianoutsou M (2021) Non-native insect species associated with eucalypts in Cyprus. Poster presented at the ENTO21' – Royal Entomological Society, 23–27 Aug 2021.

Dittrich-Schröder G, Hurley BP, Wingfield MJ, Nahrung HF, Slippers B (2020) Invasive gall-forming wasps that threaten non-native plantation-grown *Eucalyptus*: diversity and invasion patterns. Agricultural and Forest Entomology 22(4): 285–297. https://doi.org/10.1111/afe.12402

EPPO (2006) *Blastopsylla occidentalis*: a new eucalyptus psyllid found in Italy. EPPO Reporting Service 9: 2006/187. Available at: https://gd.eppo.int/reporting/article-1234

Geldmann J, Heilmann-Clausen J, Holm TE, Levinsky I, Markussen B, Olsen K, Rahbek C, Tøttrup AP (2016) What determines spatial bias in citizen science? Exploring four recording schemes with different proficiency requirements. Diversity and Distributions 22: 1139–1149. https://doi.org/10.1111/ddi.12477

Groom G, Strubbe D, Adriaens T, Davis AJS, Desmet P, Oldoni D, Reyserhove L, Roy HE, Vanderhoeven S (2019) Empowering citizens to inform decision-making as a way forward to support invasive alien species policy. Citizen Science: Theory and Practice 4(1): 33. https://doi.org/10.5334/cstp.238

Harris SE (2007) Colonial forestry and environmental history: British policies in Cyprus, 1878–1960. PhD Thesis, University of Texas at Austin, Texas, USA.

Herrmann JD, Opatovsky I, Lubin Y, Pluess T, Gavish-Regev E, Entling MH (2015) Effects of non-native *Eucalyptus* plantations on epigeal spider communities in the northern Negev desert, Israel. Journal of Arachnology 43(1): 101–106. https://doi.org/10.1636/P14-46.1

Hodkinson ID (2007) A new introduced species of *Ctenarytaina* (Hemiptera, Psylloidea) damaging cultivated *Eucalyptus parvula* (= *parvifolia*) in Europe. Deutsche Entomologische Zeitschrift 54(1): 37–33. https://doi.org/10.1002/mmnd.200700002

Isaac NJB, Pocock MJO (2015) Bias and information in biological records. Biological Journal of the Linnean Society 115(3): 522–531. https://doi.org/10.1111/bij.12532

Karaca İ, Avci M, Güven Ö (2017) *Glycaspis brimblecombei* Moore (Hemiptera: Aphalaridae), the New Exotic Pest of *Eucalyptus* in Northern Cyprus. Journal of Agricultural Science and Technology A 7: 552–556.

Kueffer C, Kull CA (2017) Non-native Species and the Aesthetics of Nature. In: Vilà M, Hulme PE (Eds) Impact of Biological Invasions on Ecosystem Services, Invading Nature. Springer Series in Invasion Ecology, Cham, Switzerland, pp. 311–324.

Lopez-Vaamonde C, Glavendekić M, Paiva MR (2010) Invaded habitats. BioRisk 4(1): 45–50. https://doi.org/10.3897/biorisk.4.66

Mansilla JP, Pérez R, Del Estal P, Blond A (2004) Deteccíon en España de *Ctenarytaina spatulata* Taylor sobre *Eucalyptus globulus* Labill. Boletín de Sanidad Vegetal – Plagas 30(1): 57–63. [in Spanish]

Meeus S, Silva-Rocha I, Adriaens T, Brown P, Chartosia N, Claramunt-López B, Martinou AF, Pocock M, Preda C, Roy H, Tricarico E, Groom Q (2021) BioBlitz is More than a Bit of Fun. Biodiversity Information Science and Standards 5: e74361. https://doi.org/10.3897/biss.5.74361

Mendel Z, Protasov A (2019) The entomofauna on *Eucalyptus* in Israel: A review. European Journal of Entomology 116: 450–460. https://doi.org/10.14411/eje.2019.046

Mifsud D (2020) The jumping plant-lice (Hemiptera: Psylloidea) of the Maltese Islands. Bulletin of the Entomological Society of Malta 11: 103–117. https://www.um.edu.mt/library/oar/handle/123456789/68257

Mifsud D, Cocquempot C, Mühlethaler R, Wilson M, Streito J-C (2010) Other Hemiptera Sternorrhyncha (Aleyrodidae, Phylloxeroidea, and Psylloidea) and Hemiptera Auchenorrhyncha. BioRisk 4(1): 511–552. https://doi.org/10.3897/biorisk.4.63

Pescott OL, Harris SE, Peyton JM, Onete M, Martinou AF, Mountford JO (2018) The Forest on the Peninsula: Impacts, Uses and Perceptions of a Colonial Legacy in Cyprus. In: Queiroz A, Pooley S (Eds) Histories of Bioinvasions in the Mediterranean. Environmental History 8, Springer, Cham, Switzerland, 195–217, https://doi.org/10.1007/978-3-319-74986-0_9

Pérez-Otero R, Mansilla JP, Borrajo P, Ruiz F (2011) Primera cita en la Península Ibérica de *Blastopsylla occidentalis* Taylor (Homoptera: Psyllidae). Boletín de Sanidad Vegetal 37(2): 139–144. [in Spanish]

Soufo L, Tamesse JL (2015) Population Dynamic of *Blastopsylla occidentalis* Taylor (Hemiptera: Psyllidae), a Psyllid Pest of Eucalypts. Neotropical Entomology 44: 504–512. http://dx.doi.org/10.1007/s13744-015-0304-7

Spodek M, Burckhardt D, Protasov A, Mendel Z (2015) First record of two invasive eucalypt psyllids (Hemiptera: Psylloidea) in Israel. Phytoparasitica 43(3): 401–406. https://doi.org/10.1007/s12600-015-0465-2

Valente C, Manta A, Vaz A (2004) First record of the Australian psyllid *Ctenarytaina spatulata* Taylor (Homoptera: Psyllidae) in Europe. Journal of Applied Entomology 128(5): 369–370. https://doi.org/10.1111/j.1439-0418.2004.00860.x